NATION SHALL SPEAK PEACE UNTO NATION

# RESEARCH DEPARTMENT

# LOW-POWER V.H.F./F.M. TRANSMITTERS
## SITE TESTS AT CORWEN (CYRN-Y-BRAIN)

Report No. K-122

(1957/6)

THE BRITISH BROADCASTING CORPORATION
ENGINEERING DIVISION

RESEARCH DEPARTMENT

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March 1957

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# LOW-POWER V.H.F./F.M. TRANSMITTERS
# SITE TESTS AT CORWEN (CYRN-Y-BRAIN)

## SUMMARY

This report gives the results of an f.m. transmitter site test at Corwen (Cyrn-y-brain). It is shown that a low-power transmitter will provide a satisfactory service for most of the population of Denbighshire and Flintshire. The service area would not extend to Anglesey and north-west Wales and another site would be necessary for this area.

## 1. INTRODUCTION

Stage II of the v.h.f./f.m. distribution plan provides for three low-power transmitters to carry the Light, Third and Welsh Home Service programmes.

Subject to Post Office permission it is proposed to radiate these programmes on frequencies of 88·9 Mc/s, 91·1 Mc/s and 93·3 Mc/s respectively.

It is proposed that the transmissions should be radiated by a substantially omnidirectional aerial elevated 120 ft (36·6 m) above ground level with an effective radiated power (e.r.p.) of 5·6 kW for each programme.

## 2. GENERAL

Test transmissions were radiated from a horizontally polarised half-wave dipole, mounted at the top of a 110 ft (33·5 m) mast. Because of the directivity of a horizontal dipole, two such dipoles were attached to the mast head, at right angles to and independent of one another, radiation being from only one dipole at a time. The field strength measurements were therefore made in four sectors. All results have, however, been corrected for an omnidirectional aerial and an e.r.p. of 5·6 kW.

All field strength measurements were made with a receiving aerial mounted 11·2 ft (3·4 m) above ground level but they have been corrected, on a linear height-gain basis, to the corresponding values for an aerial 30 ft (9·2 m) above ground level.

Site data are given in the Appendix.

F.102

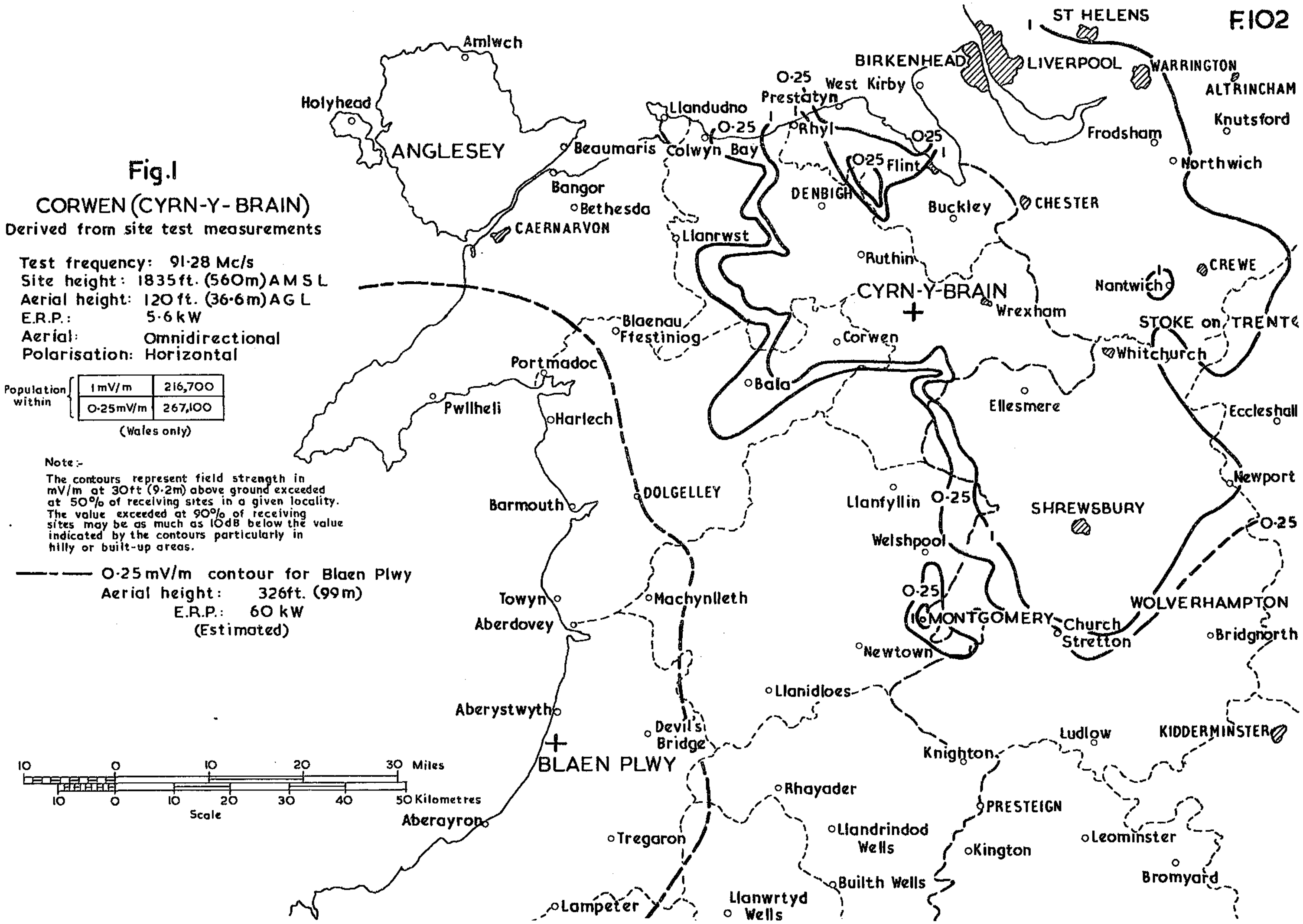

Fig.1

CORWEN (CYRN-Y-BRAIN)

Derived from site test measurements

Test frequency: 91·28 Mc/s
Site height: 1835 ft. (560m) A M S L
Aerial height: 120 ft. (36·6m) A G L
E.R.P.: 5·6 kW
Aerial: Omnidirectional
Polarisation: Horizontal

| Population within | | |
|---|---|---|
| | 1 mV/m | 216,700 |
| | 0·25 mV/m | 267,100 |

(Wales only)

Note:- The contours represent field strength in mV/m at 30ft (9·2m) above ground exceeded at 50% of receiving sites in a given locality. The value exceeded at 90% of receiving sites may be as much as 10dB below the value indicated by the contours particularly in hilly or built-up areas.

– – – – 0·25 mV/m contour for Blaen Plwy
Aerial height: 326 ft. (99 m)
E.R.P.: 60 kW
(Estimated)

## 3. RESULTS

The results of the site test are presented in a field strength contour map F.102 (Fig. 1), which also shows the estimated 0·25 mV/m contour for a projected v.h.f./f.m. transmitter at Blaen Plwy, using an aerial 326 ft (99 m) above ground level with an e.r.p. of 60 kW.

Maximum, median and minimum field strengths in the more important towns in Wales and England for the Corwen site are given in Table 1.

TABLE 1

Field Strength in mV/m at 30 ft (9·2 m) AGL

| Town | Max. | Median | Min. |
|---|---|---|---|
| WALES | | | |
| Abergele | 2·1 | 0·94 | 0·25 |
| Bala | 1·6 | 0·79 | 0·32 |
| Betws-y-coed | <0·17 | – | – |
| Buckley | >100 | 20 | 7·9 |
| Chirk | 14 | 6·3 | 2·5 |
| Colwyn Bay | 2·2 | 0·24 | <0·12 |
| Connah's Quay | 11 | 3·2 | 0·84 |
| Conway | 0·42 | 0·22 | 0·15 |
| Corwen | 16 | 4·5 | 2·0 |
| Denbigh | 47 | 9·4 | 1·2 |
| Dolgelley | 0·14 | <0·12 | – |
| Flint | 3·4 | 1·4 | 0·42 |
| Holywell | 1·8 | 0·47 | 0·16 |
| Johnstown | 6·0 | 3·0 | 1·1 |
| Llandudno | 0·63 | 0·21 | <0·13 |
| Llangollen | 24 | 8·9 | 4·2 |
| Llanrwst | 0·24 | <0·2 | – |
| Machynlleth | 0·18 | <0·15 | – |
| Mold | 13 | 6·3 | 2·8 |
| Montgomery | 2·7 | 1·3 | 0·38 |
| Newtown | 0·3 | 0·17 | <0·11 |
| Prestatyn | 0·5 | 0·19 | <0·11 |
| Rhosllanerchrugog | 7·1 | 2·4 | 0·56 |
| Rhyl | 7·9 | 2·2 | 0·45 |
| Ruabon | 6·7 | 3·0 | 1·5 |
| Ruthin | 17 | 6·7 | 1·9 |
| St. Asaph | 5·6 | 2·8 | 1·4 |
| Welshpool | 0·38 | 0·17 | <0·1 |
| Wrexham | 20 | 6·7 | 1·4 |

| | Town | Max. | Median | Min. |
|---|---|---|---|---|
| ENGLAND | | | | |
| | Altrincham | 1·8 | 0·75 | 0·28 |
| | Bebington | 17 | 5·0 | 0·94 |
| | Birkenhead | 24 | 3·0 | 0·67 |
| | Chester | 38 | 7·5 | 1·5 |
| | Church Stretton | 0·56 | 0·24 | 0·11 |
| | Crewe | 5·6 | 1·8 | 0·5 |
| | Eccles | 1·2 | 0·6 | 0·3 |
| | Gobowen | 14 | 11 | 5·0 |
| | Hanley | 2·4 | 0·84 | 0·17 |
| | Hoylake | 3·0 | 1·4 | 0·75 |
| | Liverpool | 17 | 3·8 | 0·6 |
| | Moreton | 3·8 | 2·2 | 1·1 |
| | New Brighton | 4·5 | 1·9 | 0·45 |
| | Newcastle under Lyme | 4·5 | 0·94 | 0·28 |
| | Northwich | 2·5 | 1·0 | 0·28 |
| | Oswestry | 6·3 | 1·8 | 0·79 |
| | Prescot | 11 | 3·5 | 1·0 |
| | Runcorn | 4·5 | 2·5 | 1·8 |
| | Sale | 1·1 | 0·7 | 0·35 |
| | Shrewsbury | 13 | 2·0 | 0·24 |
| | Stretford | 1·5 | 0·67 | 0·3 |
| | Wallasey | 8·9 | 2·8 | 0·7 |
| | Warrington | 3·0 | 1·3 | 0·34 |
| | Wellington | 8·9 | 3·4 | 0·89 |
| | Wem | 7·0 | 2·7 | 1·4 |
| | West Kirby | 9·4 | 2·4 | 0·67 |
| | Whitchurch | 5·0 | 1·9 | 0·35 |
| | Whittington | 10 | 6·3 | 2·8 |
| | Widnes | 7·9 | 2·2 | 0·79 |

From Fig. 1 (map F.102) it will be seen that most of Denbighshire and Flintshire will receive a very good service. Wrexham, with a median field strength of 6·7 mV/m, together with the towns of Denbigh (9·4 mV/m), Ruthin (6·7 mV/m), Buckley (20 mV/m) and Corwen (4·5 mV/m), will receive an excellent service. Rhyl, with a median field strength of 2·2 mV/m, will be on the average well served, though some parts of the town may only receive a signal of approximately 0·45 mV/m. The coastal towns of Llandudno (0·21 mV/m) and Colwyn Bay (0·24 mV/m) are just outside the second-class service area, but many parts of both these towns will receive quite an acceptable service.

To the south, only a very small sector of Montgomeryshire will be served and the towns of Welshpool and Newtown, both with a median field strength of 0·17 mV/m, are outside the second-class service area. Montgomery, on the other hand, because of local topography, will be well served, the median field strength being 1·3 mV/m.

To the north-east, east and south-east of the site, the land is low-lying, hence the first-class service area embraces Liverpool, Warrington, Northwich, Whitchurch and Shrewsbury.

Table 2, prepared by Engineering Information Department, shows the estimated population within the 1·0 and 0·25 mV/m contours for the Welsh Region only.

TABLE 2

| Field Strength mV/m | Population in Welsh Region |
|---|---|
| 1·0 | 216,700 |
| 0·25 | 267,100 |

From Fig. 1 (map F.102) it is clear that the proposed 5·6 kW transmission from Corwen (Cyrn-y-brain) will not serve the whole of north Wales and Anglesey. Consideration is now being given to finding sites for one or possibly two additional transmitters to make good this deficiency in the service area.

## 4. CONCLUSIONS

A transmitter with an e.r.p. of 5·6 kW at Corwen (Cyrn-y-brain) will provide a good v.h.f./f.m. service to most of Denbighshire and Flintshire. One or more additional transmitters will be required to provide the remainder of north Wales and Anglesey with a v.h.f./f.m. service.

## APPENDIX

| | |
|---|---|
| Site Height: | 1835 ft (560 m) AMSL |
| Latitude: | 53° 01' 48" N |
| Longitude: | 03° 10' 50" W |
| National Grid Reference: | 33(SJ)/208489 |

EGF